science
webinar
series

Atmosphere, aerosols and ACCESS:
Composition and climate in Australia's climate model

16 January 2018, 2.30–3.30 pm (AEDT) –
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The composition of the atmosphere changed significantly during the 20th century. Not only have increasing concentrations of greenhouse gases such as carbon dioxide and methane warmed the Earth, but other atmospheric constituents, many of which are also increasing due to human activity, have exerted a strong influence on our climate.

For example, the concentration of aerosol in the troposphere has increased since the pre-industrial period, exerting a cooling influence that has offset a portion of climate warming in certain regions.

Higher up in the atmosphere, in the stratosphere, man-made ozone-depleting substances have been accumulating, leading to the formation of the ozone hole. The impacts of the stratospheric ozone hole are many and diverse, opposing some aspects of greenhouse gas-induced climate change, and exaggerating others. While now thought to be on the mend, the timescale for ozone hole recovery is poorly known. As the ozone hole gradually heals, the associated climate effects will slowly unwind.

As important as it is to understand the sources and effects of man-made atmospheric constituents, it is equally critical to understand those that occur naturally.

Estimates of radiative forcing and human-induced warming relative to a pre-industrial world depend on accurate quantification of pre-industrial aerosol and gas emissions. Information about pre-industrial aerosol and gas emissions are challenging to derive from observational records, meaning models have an important role to play.

Considering the effects of natural and man-made aerosol and gas emissions (beyond carbon dioxide and methane) enhances both our understanding of present-day climate and our ability to predict future climate. Recent advances in earth system modelling and computational capacity mean we can now simulate the physical and chemical effects of aerosol and gas emissions, and their impact on all aspects of the Earth system.

In this webinar, Dr Matt Woodhouse will discuss:

- the role of natural marine aerosol in the Earth system
- the effect a recovering stratospheric ozone hole could have on the Earth system
- how we can use the ACCESS composition-climate model for a better understanding of the Earth system.

Dr Matt Woodhouse is a research scientist in the CSIRO Climate Science Centre. His research focuses on the role of aerosol and gas-phase constituents on the global climate system, and how to evaluate and simulate them in a climate model. In particular, Matt has expertise in modelling marine aerosol, especially dimethyl-sulfide (famed for its role in the CLAW hypothesis) and more recently marine organic emissions. He is currently working to provide the Australian community with comprehensive composition-climate modelling capability, based on the ACCESS model. Matt contributes to two ESCC projects: *Preparing ACCESS for CMIP6* and *Improving Australia's climate model (ACCESS)*.